MATH 332
Quiz III
September 28, 1989 Name Key

1. Prove:
If C and B are inverses of the matrix A, then B = C.

$AC = I$

$BAC = BI = B$

$(BA)C = B$

$IC = B$

$C = B$

2. Find the inverse of the following matrix (Think!):

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$ self.

3. Give the elementary matrix which performs the row operation of adding 3 times the third row to the second row of a 3x3 matrix.

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$$

4. In matrix algebra, can we say $(A+B)^2 = A^2 + 2AB + B^2$? Either justify, or else what can we say?

no

$(A+B)^2 = A^2 + AB + BA + A^2$

5. Find the determinant of the following matrices: (Show work. Think!)

$$\begin{bmatrix} 2 & 9 \\ 8 & 2 \end{bmatrix} = 4 - 72 = -68$$

$$\begin{bmatrix} 2 & 0 & 8 & -6 & 4 \\ 2 & 0 & 8 & -6 & 4 \\ 9 & 8 & 5 & -8 & 2 \\ 0 & 6 & -7 & 8 & 2 \\ 0 & 4 & 3 & -1 & 1 \end{bmatrix} = 0$$ 2 rows same.

$$\begin{bmatrix} 2 & 8 & 2 \\ 0 & 2 & 1 \\ 0 & 0 & -1 \end{bmatrix} = 2 \cdot 2 (-1) = -4 \quad (\triangle)$$

$$\begin{bmatrix} 1 & 2 & 4 & 0 \\ -1 & 2 & -1 & 0 \\ 2 & 2 & 10 & 2 \\ 1 & 2 & 1 & 0 \end{bmatrix} = -2 \det \begin{bmatrix} 1 & 2 & 4 \\ -1 & 2 & -1 \\ 1 & 2 & 1 \end{bmatrix} = -2 \left[\begin{vmatrix} 2 & -1 \\ 2 & 1 \end{vmatrix} - 2 \begin{vmatrix} -1 & -1 \\ 1 & 1 \end{vmatrix} + 4 \begin{vmatrix} -1 & 2 \\ 1 & 2 \end{vmatrix} \right]$$

$$= -2 \left[4 + 0 + 4(-4) \right]$$

$$= -2(+12) = 24$$